IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appln No.: 10/826,709

Confirmation No. 1774

Filed: April 16, 2004

Applicants: Gaonkar, et al.

Title: Mulitlayer Edible Moisture Barrier for Food Products

Art Unit: 1761

Examiner: Corbin, Arthur

Attorney Docket No.: 77046

Customer No.: 22242

SUPPLEMENTAL DECLARATION UNDER 37 C.F.R. § 1.132

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir or Madam:

I, Jimbay P. Loh, pursuant to 37 C.F.R. §1.132, declare as follows:

1. I have read the claims filed in the amendment filed in this application on or about January 9, 2006 and I am familiar with the subject matter of this patent application.

2. The claims which are to be filed in an amendment in this application describe an edible moisture barrier with

a lipid layer comprising from 65 weight percent of an edible low melting triglyceride blend having a melting point of 35°C or less;

from 1 to 35 weight percent of an edible microparticulated high melting lipid having a melting point of 70°C or higher and a volume average particle size of less than 10 microns;

the lipid layer has a solid fat content of 50 to 70 weight percent at a storage temperature;

at least 5 percent of the lipid particles having a particle size of not more than 0.1 microns;

the solid fat content of the lipid layer generally does not change more than 5 weight percent at a refrigerated storage temperature of 0°C to 10 °C or at an ambient storage temperature of 15°C to 25°C; and

at least one flexible hydrophobic barrier layer.

The lipid particles of not more than 0.1 microns are effective to prevent liquid oil in the moisture barrier composition from draining from a fat crystal network in the barrier composition in a greater amount than if the sufficient lipid particles of not more than 0.1 microns were not present.

3. Too high of a solid fat content at a storage temperature makes the moisture barrier too brittle and prone to holes through which moisture could pass. Too low of a solid fat content at storage temperature makes the moisture barrier too soft and runny, and thus the moisture barrier is ineffective as a result of difficulty in maintaining a stable barrier thickness on a food surface as well as the draining of the liquid oil from the fat particles. Balancing solid fat content, temperature and particle size is important. Further, the moisture barrier described in this application has the combination of a high melting point microparticulate lipid and low melting triglyceride uses the lipid particle size to stabilize the oil fraction of the triglyceride blend. This stabilization is important in that it permits the cooling of the product at very broad rates.

4. It is believed that the small lipid particles stabilize the fat, but at least in part because the lipids are high melting. The small high melting lipid particles do not grow during a rapid cooling which growth would permit the liquid oil to destabilize from the barrier composition and drain from it. Further, the microparticulate high melting lipid promotes the formation of small fat crystals (from the triglyceride blend during cooling) which also contribute to the immobilization of the remaining liquid oil during cooling. The fact that the particles are lipid and are highly hydrophobic also is important because the composition or make up of the particle permits the small lipid particles to associate with the fat and stabilize fat particles in the moisture barrier composition.

5. In known fat/lipid systems liquid fat does not necessarily remain stable at low storage temperatures and/or under storage temperature fluctuations. For example, chocolate includes cocoa butter and looks stable at elevated temperatures. Yet, at lower storage temperatures, the fat in the cocoa butter will crystallize and fat particles grow. This growth results in larger fat particles which cause blooming of the fat on the surface of the chocolate. The system has destabilized. In contrast, the solid fat content in the moisture barrier

described in the claims remains stable at 5°C such that the solid fat content does not change more than 5 weight percent. In this moisture barrier composition, fat crystals do not grow and cause a destabilization of the moisture barrier.

6. I believe that evidence indicates there are considerable amount of small lipid particles in the composition described in the claims and that these particles stabilize the moisture barrier. For example, in the moisture barrier described in this application, I know the amount of high melting point lipid in the barrier composition. Putting this composition under a 10 power microscope shows the amount of particulate matter I can see. Particles of less than about 0.3 microns can not be seen under such a microscope. The difference between the amount of particles I can see and the amount of solid lipids which are there (but cannot be seen) permits me to conclude that smaller particles, such as 0.1 microns, are present and stabilize the moisture barrier. Small lipid particles of 0.1 micron or less can be seen under a 1000 X power microscope and appear like dusty stars in the Milky Way Galaxy. Commercial particulate lipid compositions of which I know do not have sufficient small lipid particles of 0.1 micron or less to stabilize the moisture barrier because microscopic examination of such compositions indicates such small particles are not present in any amount which would provide stabilization of the moisture barrier. Commercial particulate lipid compositions have large particles and would have to be milled and microparticulated to have sufficient lipid particles of 0.1 microns or less to provide a moisture barrier which is stable and a reduced moisture loss as described in this application.

7. Data which compares the effectiveness of a moisture barrier having large lipid particles versus small lipid particles is set forth herein and a curve illustrating this data is attached hereto. The importance of particle size is illustrated by this data and the results shown by the graph attached hereto are new and unexpected. The barriers tested included: (1) 10 weight percent solid fat and 90 weight percent low melting liquid triglyceride fat with large lipid particles having an average particle size of 5.1 microns; (2) 70 weight percent solid fat and 30 weight percent low melting liquid triglyceride fat with large lipid particles having an average particle size of 5.1 microns; (3) 10 weight percent solid fat and 90 weight percent low melting liquid triglyceride fat with small lipid particles where there is a significant amount of solid lipid particles of less than 0.1 microns; and (4) 70 weight percent solid fat and 30 weight percent low melting liquid triglyceride fat with small lipid particles where there is a significant amount of solid lipid particles of less than 0.1 microns. As can be seen from the attached graph, the moisture barrier with the solid small lipid particles had a significantly reduced moisture loss over the barrier with the large lipid particles. These results are new and unexpected.

8. Known systems which have broad ranges of liquid oil and solid lipids at elevated temperatures do not inherently represent the moisture barrier described in this patent application. The correct amount of high melting lipid with the correct particle size has to be combined with the correct amount of liquid oil to provide the stable system. The small solid lipid particles stabilize the moisture barrier system even though the barrier composition which is applied to form a moisture barrier layer at one point in time may be hot and the fat in liquid form; and then at one point in time the barrier composition is cooled (as for example after application to form a barrier layer), set and stored on a substrate such as bread. In applying the moisture barrier to a food substrate, the rate of crystallization of fat crystals cannot be

effectively controlled to keep the fat crystals small and the moisture barrier stabilized. Use of small lipid particles which are sufficiently compatible with fat to permit a seeding of fat crystallization not only stabilizes the moisture barrier compositions, but also permits a retention of the viscosity of the moisture barrier compositions at elevated temperatures which enhances the ability to cling to a substrate. Without the small lipid particles of 0.1 microns or less, these aforedescribed properties together with a good mouth feel are not obtained.

9. I have reviewed at least two of the references which have been seen as rendering the moisture barrier of this patent application not patentable.

> A. The Averbach patent (USPN 5,130,151) addresses a problem of cracking lipids in a moisture barrier. Averbach does not suggest the importance of particle size of the lipid wax and indeed uses very low amounts of lipid. In my opinion the stabilization of the moisture barrier in the barrier described in this application would be new and unexpected over Averbach.
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> B. The Saur patent (USPN 5,520,942) Saur describes spraying an additive, such as a wax, in a fat or oil solvent, onto a food product where the result is a moisture barrier. Saur uses a supercritical fluid such as carbon dioxide as a carrier for oil or fat soluble flavorant, or for edible moisture barriers. Col. 2. While Saur describes particles which are 1-100 microns, there is not distinction between liquid or solid particles. See Column 4, ln 55 et seq of Saur. This distinction has extreme importance with the moisture barrier described in this patent application.

10. The Examiner has suggested that in view of Saur and the 1-100 micron range set forth therein that I try to duplicate a moisture barrier having a particle size of one micron and compare it with a barrier that has particles of less than 0.1 micron. Saur does not provide sufficient information to do such a comparison. Saur merely provides a range of particle sizes for a food additive which particles may be liquid or solid suspended in a super critical fluid. That is not the subject matter of the instant patent application. Indeed Saur's particle sizes in Saur's particle size range are large. This suggests the use of commercial compositions which do not have sufficient small particles which would stabilize a moisture barrier of fat and liquid oil.

11. Without knowing the particle distribution of the particles in the Saur spray and if I assume the average particle size in Saur's super critical fluid is one micron, I cannot generate data to compare that composition with a composition described in the claims. This is because I do not know that particle size distribution in Saur's spray which uses the super critical fluid. If the particle size range of Saur's composition was truly 1 to 100 microns then clearly the particles in the composition would be too large for stabilization of a moisture barrier composition as the data described in this declaration show. If I assume all of Saur's particles were one micron and I assumed that the effectiveness of small particles in moisture barrier was linear, that is one micron particles were five times more effective than five micron particles, then I can conclude that particles with a 0.1 micron or less size will provide a significantly more effective moisture barrier than the composition with a one micron size. To make a composition that is entirely made of particles which are one micron would be

extraordinarily difficult and time consuming. Moreover, even if it were made, it would not permit a precise comparison with the composition of Saur because Saur's composition almost certainly has particles of various sizes where the particle size distribution is not determinable from the Saur patent.

The undersigned, being warned that willful false statements and the like are punishable by fine or imprisonment, or both (18 U.S.C. §1001) and may jeopardize the validity of the application or any patent issuing thereon, hereby declares that the above statements made of my own knowledge are true and that all statements made on information and belief are believed to be true.

Date: July 7, 2006

Jimbay P. Loh